

For purposes of effective comparison, it may be well briefly to indicate the acknowledged gaps and apparent defects in our system, and the possibility of remedying them by the adoption of particular types of school and methods of instruction from other countries. It is by such an eclectic process that the Japanese are transforming themselves, and have gradually built up a system of education which, upon paper at least, leaves little to be desired. Notwithstanding the constant criticism levelled against the ancient universities and great public schools, I do not consider that they fail to realise their respective functions.

It is with reference to the ordinary secondary schools that the position is so unsatisfactory, and for their improvement we must, as I have already intimated, learn from Germany, or Holland, the burgher schools of which furnished the Germans with their models. Simultaneously, the facilities for promoting the easy passage of suitable pupils of all ranks from one type of school to another ought to be increased.

In elementary education as a whole we stand unrivalled, with the possible exception of Holland, where the methods of instruction are still as Cuvier described them, "au-dessus de tout élogé." It would be folly to expect the same standard of excellence in all schools, having regard to the infinite variety of conditions under which each school is conducted. The great need, commonly, is for more practical instruction, some relaxation of the regulations as to building and equipment for manual instruction and domestic science, and the introduction of a system of supplementary courses. We require, as Prof. Sadler has pointed out, a new type of school in which less attention is paid to purely literary subjects and more to the practical side.

The teacher is the most important factor. Upon his character, capacity, and sympathy the quality of each school depends far more than upon the public spirit of the local authorities and managers. His training is still too limited and hampered by the exigencies of the certificate examination. The normal schools of both France and Holland are conducted on far more enlightened principles. It is recognised that there are certain subjects, such as the theoretical and practical study of natural and physical science, which every teacher, whether destined for an urban or a rural district, ought to know. We do not want to create two distinct classes of teachers or to establish separate institutions for those who will have charge of country schools, but we do want the student during his period of training to become qualified to discharge all those duties which are involved in the modern conception of an elementary school. In Holland, for instance, every student has a systematic course of instruction in horticulture and the elementary principles of agriculture. In woodwork every student makes a complete set of the models of the Swedish Slöyd system and of objects required for other lessons, such as chisels, rulers, levers, and scales; models of tools or engines to assist in explaining different trades and industries; implements for the manufacture of linen and lace, &c. In addition, each student constructs an aquarium, terrarium, and a case for insects to be collected and attended to by himself. Beyond acquiring a mass of information invaluable to him in his profession, he learns how to make the apparatus necessary for object-lessons in the primary school.

The outstanding blot upon English education is the absence of any adequate provision for those who have completed the elementary-school course but do not proceed to a secondary school. To expend millions upon these children until the age of thirteen or fourteen, and then to turn them over to the education of the streets, is disastrous from every point of view. It is during the period of adolescence that the habits are formed which will determine the boy's or girl's whole future career. Cast adrift as they are in the vast majority of cases to rely upon their own resources, they constitute a grave social danger, swell the ranks of the unemployed, and gravitate to the workhouse or the gaol. It is computed that only one in six between the ages of fourteen and twenty-one are receiving any systematic instruction. Taking those between fourteen and eighteen, 2,000,000 out of 2,800,000 have done with education altogether. Minister after Minister of

Education deplores this, but no practical steps have ever yet been taken by any Minister to remedy the evil.

Continuation schools, however, are not alone sufficient. A few trade schools have been established, but they should be the rule, and not the exception. The Ambachts or trade schools of Holland furnish a good example. Those admirable institutions owed their origin to private or local initiative, but are subsidised and inspected by the Government. The course usually lasts for three years, and the instruction is continuous throughout the year. The subjects naturally depend to some extent upon local circumstances, but generally include drawing, geometrical drawing, physics, mathematics, mechanics, wood and metal work, all taught technically and with the view of particular industries. In some cases instruction is also given in masonry, furniture and instrument making, painting and house decoration. The results are undoubtedly excellent. For some time artisans were a little jealous of this trade instruction, but now there is an increasing demand by them for lads who have completed the school course. It is intended that pupils should proceed direct from the primary school at the age of twelve or thirteen, and this is the usual custom. A few boys occasionally attend after leaving the intermediate schools or the gymnasia.

Now that the Board of Education has substantiated its claim to be the responsible authority for agricultural education, it would be wrong to ignore that question altogether. We are as far behind other nations in that respect as in the training and instruction of children when they leave the elementary school. In proportion to the agricultural population we have a greater number of advanced colleges than are to be found in any country, but for the rank and file of young farmers and smallholders facilities for acquiring that knowledge which today is essential to the successful cultivation of the soil can hardly be said to exist. We are constantly reminded of the agricultural prosperity of Denmark, but it is generally forgotten that that prosperity is due to the excellence of the people's high schools, which impart a sound secondary education, and which are free from any agricultural bias. The attempt to combine agricultural teaching with general education was quickly discarded by the Danes. What we require are winter schools and classes corresponding to those in Ireland and Holland, a few practical schools of agriculture of the type of those in France, and farm institutes of the character recommended by Lord Reay's Departmental Committee.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

BIRMINGHAM.—Dr. Robert Simon has been elected to the chair of therapeutics rendered vacant by the death of Prof. Foxwell.

Prof. J. W. Taylor has resigned the chair of gynaecology.

Mr. E. E. Fournier d'Albe has been appointed assistant lecturer and demonstrator in experimental physics to fill the vacancy caused by the resignation of Mr. F. W. Aston, who has accepted a post as assistant to Sir J. J. Thomson at the Cavendish Laboratory.

Mr. George Heaton has been appointed lecturer in operative surgery, and Dr. Edgar P. Hedley has been elected to a demonstratorship in chemistry.

Prof. Bostock Hill has been asked to act as a delegate to represent the University at the Congress of the Royal Sanitary Institute to be held in Brighton in September, and also at the International Congress on School Hygiene which meets in Paris in March next.

Prof. F. W. Gamble, F.R.S., has been appointed to represent the University at the eighth International Zoological Congress at Graz (Austria) in August.

CAMBRIDGE.—The Public Orator, Dr. Sandys, spoke as follows in presenting Dr. Mark Aurel Stein for the degree of Doctor of Science *honoris causa* on January 20:—

Adest vir scientiarum non minus quam litterarum de finibus proferendis bene meritis, qui Hungariae in urbe maxima natus, et inter Tubingenses Oxoniensesque linguis orientalibus eruditus, in imperio nostro inter Indos iam per annos plurimos scholis et collegiis nostris admini-

strandis non sine laude praefuit. Ibi, tot laboribus occupatus, tempora tamen subsiciva (ut aiunt) fluminis Indi regionis montanae annalibus antiquis diligenter edendis et luculenter illustrandis non sine fructu dedicavit. Ibi, tot laborum per intervalla, itinera illa magna, Indiae proconsulis magni auspicio, est aggressus, unde gloriam maximam merito est adeptus. Olim, ultra Indiae terminos in regiones propiores prospere peregrinatus (ut alia praeteream), petram Aornon accuratius investigandam esse duxit, rupem illam praecipitem et abruptam "ab Hercule frustra obsessam," ab Alexandro post pericula plurima captam et Minervae Victoriae consecratam.¹ Idem viatoris antiquissimi vestigiis sacris ingressus,² Asiae in ipsa penetralia plus quam semel peregrinatus est. Illic, itinere longinquo in uno, regionis deserta ex arenis, quot "oppidum cadavera"³ diu sepulta, quot tabellarum litteris priscis inscriptarum reliquias, per saecula longa quam tuto conservatas, eruit! In altero autem, regionem quam immensam minutissime permensus, quot tabulis pictis domi delineandam tradidit! Quot turres diu desolatas, quot imperii Sinensis olim latius porrecti propugnacula, dinumeravit! Quam ingentem librorum in quanta linguarum varietate scriptorum multitudinem, quam multa denique artium Graecarum, artium Asiaticarum monumenta, aut pictoris aut sculptoris manu antiquitus exornata, Britanniae in Museum maximum victor reportavit! Herculis praesertim et Minervae et Amoris imagines, olim gemmis insculptis in creta impressas, ab eodem inventas recordati, confitemur inventori tam strenuo, tam sagaci, tam amabili, neque Herculis fortitudinem virtutemque, neque Minervae prudentiam, neque Amorem ipsum, scientiarum et veritatis amorem incorruptum, defuisse.

Duco ad vos Asiae exploratorem impigrum, prudentem, perdoctum, virtutis antiquae exemplar bene nominatum, Marcum Aurelium Stein.

Mr. R. C. Punnett, superintendent of the Museum of Zoology, has been elected to the professorship of biology recently vacated by Prof. W. Bateson. Mr. Punnett took his degree in 1898, obtaining a first class in part ii. of the natural sciences tripos. He was awarded the Walsingham medal in 1900. He has also received the Thruston medal. For some time he held the Balfour studentship, to which he was elected in 1904. He succeeded Dr. Harmer as superintendent of the Museum of Zoology at the beginning of last year.

Prof. W. Bateson, who vacated an ordinary fellowship at St. John's College on resigning the professorship of biology, has been elected to an honorary fellowship.

The chairman of the special board for anthropology gives notice that Mr. Roscoe will give a course of lectures during the present term on the natives of Uganda. The lectures will be given on Fridays (commencing on Friday, January 28), at 5 p.m., in the lecture theatre of the Archaeological Museum.

THERE is about to be introduced into Congress a Bill "to promote health and efficiency by the establishment in the United States Bureau of Education of a division for the collection of scientific data on physical education and for the dissemination thereof." The proposal originated at a recent convention of the National Education Association, which appointed a committee to direct the attention of Congress to the need of governmental action on the subject. The association emphasises especially the growing importance of physical culture in view of the increased tendency to the congestion of the population of America in cities.

THE first meeting of the newly formed London branch of the Mathematical Association will be held at the Polytechnic, Regent Street, on Saturday, January 29, at 2.45 p.m. Mr. A. W. Siddons (Harrow) will read a paper on the Board of Education circular on the teaching of geometry, and amongst those who will contribute to the discussion are Miss Home, Miss Gwatkin, Mr. G. St. L. Carson, Dr. T. P. Nunn, Mr. J. G. Hamilton, Mr. F. J. G.

¹ Curtius, viii. 11, 2-24.

² A reference to Hsuen-Tsang, the great Chinese pilgrim of 649 A.D. whom Dr. Stein claimed as his "guide and patron-saint" ("Sand-buried Ruins of Khotan," ed. 1904, p. xxi., &c.).

³ Ap. Cic. *ad Fam.* iv. 5, 4.

Whipple, and Mr. T. J. Garstang. There will be an exhibition of books and models. Those desiring to attend are requested to communicate with the honorary secretary, Mr. P. Abbott, 5 West View, Highgate Hill, N.

ACCORDING to the *Madras Educational Review*, Sir F. D. Lugard, the Governor of Hong Kong, has reported to the Government that Mr. H. N. Mody has offered to present the colony with the building necessary to start a university. A committee has been formed, with the Governor as chairman, to promote the undertaking. Mr. Mody's original offer was to give a sum of 30,000l. for this purpose, and a further 6000l. towards the endowment. Plans of the necessary buildings were prepared, and as the Director of Public Works estimated that the cost would not be less than 58,000l., Mr. Mody undertook to provide them in accordance with the plans which he had approved, no matter what the cost might be, stipulating, however, that he should use on the buildings the 6000l. originally given for endowment if it should be required.

A COPY of the report of the principal of the Huddersfield Technical College for the session 1908-9 has reached us. The number of students in attendance during the session amounted to 1593, an increase of 106 over the previous year. The principal directs attention to the urgent national and civic importance of an early attempt to remedy by legislation the defects in our present system of public education. He points out that, after passing through the standards in the primary schools, most of the nation's children are cast adrift upon the world untouched by any educational influence, the great majority before they reach the age of fourteen, and many thousands before they are thirteen. There are in England and Wales more than 1,500,000 boys and girls below the age of seventeen who are not in attendance at any school, whether day or evening, primary, secondary, or technical. It is to be hoped that the need for the continued educational oversight and care of this army of adolescents will be recognised by our legislators speedily. Half-time labour below the age of fourteen, he insists, must be abolished, and the school-leaving age raised to fourteen at least, while some beginning should be made in the work of providing for the continued instruction of those children who at present escape from all educational supervision on leaving the day school.

THE *Builder* for January 15 has an illustrated article on the accepted design for the City of Leeds Training College. The portion of the estate of Kirkstall Grange, Far Headingley, near Leeds, which is to be utilised measures seventy acres in extent. The major portion has been purchased from Lord Grimthorpe, and about thirty acres have been leased for seven years. The existing house, a fine example of eighteenth-century work, is very wisely to be retained in the scheme. A finer site could hardly have been obtained. The scheme of buildings comprises educational block; five hostels for women and two for men, in addition to the existing mansion, which is to be utilised as a hostel for men; baths and laundry; sanatorium; principal's and vice-principal's houses; women's and men's games pavilions, together with the requisite lodges. Sir Aston Webb, as assessor appointed by the committee, placed the design of Mr. G. W. Atkinson first. The front elevation of the educational block in this design consists of a centre and two end pavilions connected by wings; crowning the centre, where a recessed portico of the Corinthian order standing on a basement is employed, is a low dome. The whole composition has an air of Georgian refinement which accords well with Kirkstall Grange, and the scheme, when translated from paper to reality, will make the educational apparatus of Leeds Education Committee as nearly perfect as is possible in the present state of our knowledge.

THE Maharaja of Durbhanga, presiding at the end of December last at the Lahore Industrial Conference, spoke of the industrial activities of India. The *Pioneer Mail* reports him to have said that the first and foremost of all Indian industries is agriculture. Agriculture is receiving the serious attention of the Government. Agricultural colleges and Government farms planted here and there have been doing fruitful work so far as they are able, but

there are not enough of them yet to do more than touch the fringe of the subject. Scientific agriculture must begin to be taught and learned at all the primary schools in India, every pupil being practically instructed by means of gardens attached to each school. The agricultural education of the people must be put in the foreground of the endeavours of the Government and of all the educational authorities. Experiments at the Government farms have shown that with selected seed and proper treatment an acre can be made to yield, on an average, from 50 to 100 per cent. more than it does at present. To take an instance, the average output of wheat in India is only from nine to ten bushels per acre. In Great Britain it is more than thirty. To raise the average in India even to fifteen bushels is surely not beyond the reach of science. The same remarks might be made in regard to all the food crops. An attainable 50 per cent. more, when realised, would go far to banish scarcity and famine from the land.

PROF. RUDOLF TOMBO, jun., of Columbia University, contributed to *Science* of December 24 last an article dealing with university registration statistics in the United States. The returns are given for twenty-eight of the leading universities, three institutions having been added to the list this year, viz. Texas, Tulane, and Washington (St. Louis). In 1909 four universities—Iowa, Minnesota, New York, and Yale—showed a loss in enrolment compared with the previous year, as against two universities in 1908 and five in 1907. On the whole, there were considerable gains, the increase in several instances being quite marked. The greatest gains were made during the year by Columbia, Chicago, Wisconsin, California, Cornell, Ohio, and Pennsylvania, in the order named, each one of these having gained more than 300 students. Columbia was the only university to register an increase of above 400 students in 1909, whereas there were no fewer than eight in 1908. For the second time in the history of American universities the 6000 mark was exceeded, Columbia having a total enrolment in 1909 of 6132 students, Harvard having registered 6013 in 1903. Harvard continues to lead in the number of male academic students, being followed by Yale, Princeton, Michigan, Chicago, Wisconsin, Columbia, and Minnesota. A general depression occurred in the case of the engineering schools, Stanford being the only institution to exhibit a noteworthy gain. The important schools of agriculture showed an increase, the single exception being Minnesota. The article concludes with an individual examination of the statistics of the more important of the universities.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, January 20.—Sir Archibald Geikie, K.C.B., president, in the chair.—Dr. C. Bolton: Further observations on the pathology of gastric ulcer (progress report). In four previous papers the production and properties of gastro-toxic serum, obtained by immunising the rabbit with guinea-pig's gastric cells, were described, and it was demonstrated that the ulcers produced by the serum healed within three or four weeks if the animal were in its normal condition and fed on a normal diet. Since chronic gastric ulcer in the human subject is a common malady, and gastric ulceration is initially acute, it was considered that some unknown condition or conditions must be present which delay the healing of these ulcers. It was, however, found on experiment that so long as the stomach emptied itself in the normal time it was impossible to delay the healing of gastric ulcer by increased or diminished acidity of the gastric contents or by feeding on infected food; the position of the ulcer in the stomach did not materially affect the result. The present communication deals with the effects of interference with the motor function of the stomach upon the healing of ulcer, the food and acidity of the stomach contents being normal. The gastric ulcers were produced in the cat by the local injection of gastro-toxic serum into the stomach wall, the serum being prepared by immunising the goat with the gastric cells of the cat. Motor insufficiency of the stomach, leading to retention of its contents, which is one of the

commonest forms of indigestion of food in man, was produced by constricting the pylorus of the cat by means of rubber tubing, the ulcer then being formed on the anterior wall of the stomach. It was found that in these circumstances the healing of the ulcers was delayed for at least twice the normal time. The ulcers, however, eventually healed up, but the regenerated mucous membrane was of a lower type than normal. Thus it may consist on the forty-first day of a single layer of cubical cells such as should be found on the tenth day of normal healing, or of glands formed entirely of duct epithelium. It was further found that the more sclerotic the base of the scar the more badly developed was the mucous membrane. In certain cases the normal healing of the ulcers was occasionally delayed by necrosis of the granulation tissue forming their bases, or by excessive formation of fibrous tissue, and in these cases the mucous membrane was of the lower type. It was therefore considered that the delay in healing in motor insufficiency was an exaggeration of the condition occasionally seen in the normal state. Both conditions are due to digestion or irritation of the base of the ulcer, leading to necrosis or increased formation of fibrous tissue, so that the regenerated mucous membrane is either unable to grow over it at all or only consists of a single layer of cells or of glands of a lower type than normal. When the base is excessively fibrous the glands have not a sufficiently vascular and cellular stroma in which to proliferate.—Dr. G. Dreyer and J. Sholto C. Douglas: The velocity of reaction in the "absorption" of specific agglutinins by bacteria, and in the "adsorption" of agglutinins, trypsin, and sulphuric acid by animal charcoal. Though a fair number of observations exist as to the influence of time on the so-called adsorption processes, e.g. the adsorption of a dye by a fibre (Bordet, Bayliss, &c.) proving that it takes a very considerable time before equilibrium is reached, the study of the time reaction in the taking up of agglutinins by bacteria has been confined to the observations of Eisenberg and Volk. These authors maintain that the velocity of reaction is extremely fast, and that equilibrium is reached in five minutes, even at a temperature of 0° C., and that no appreciable difference is to be found in the absorption velocity, whether the reaction takes place at 0° C. or 37° C. The present authors' results, which are contradictory to those of Eisenberg and Volk, may be summarised as follows:—(1) the establishment of equilibrium in the absorption of agglutinins by their specific bacteria is not attained, as stated by Eisenberg and Volk, in less than five minutes at 0° C.; but takes a considerable time, since equilibrium is not reached at room temperature even in four hours; (2) the adsorption of agglutinin or trypsin by charcoal does not reach an equilibrium within four hours at room temperature, nor the adsorption of sulphuric acid by charcoal in twenty-four hours, or possibly even in forty-eight hours; (3) there is no justification for judging as to the nature of the interaction between an absorbing substance and a material absorbed from the rapidity or slowness with which equilibrium is attained, as has been done by Arrhenius.—Dr. G. Dreyer and J. Sholto C. Douglas: The absorption of agglutinin by bacteria, and the application of physico-chemical laws thereto. Eisenberg and Volk, in 1902, were the first to make more or less exact quantitative measurements of the absorption of agglutinins by bacteria. They showed that if agglutinating serum were treated in varying dilutions with a constant amount of homologous bacteria, the amount of agglutinin taken away was not constant, but that in a concentrated serum the absolute amount removed was greater than in a diluted serum, whilst, on the other hand, the relative amount taken away in a dilute serum was much the greater. By taking the experiments of Eisenberg and Volk, Arrhenius showed the existence of a relation between the quantity of absorbed agglutinin, C, and of the agglutinin left in the fluid, B, and expressed this relationship in the simple formula $C = \sqrt{B}$. The result of the present experiments may be summarised as follows:—(1) when an agglutinating serum in different concentrations is treated with constant amounts of bacteria, the quantity absorbed, C, may not only increase to a limit value, but may, when this point is passed, even decrease to zero when the concentration of the serum is further increased, which is quite different to